ABSTRACT OF THE DISCLOSURE

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Lipid-nucleic acid particles can provide therapeutic benefits, even when the nucleic acid is not complementary to coding sequences in target cells. It has been found that lipidnucleic acid particles, including those containing non-sequence specific oligodeoxynucleotides, can be used to stimulate cytokine secretion, thus enhancing the overall immune response of a treated mammal. Further, immune response to specific target antigens can be induced by administration of a antigenic molecule in association with lipid particles containing non-sequence specific oligodeoxynucleotides. The nucleic acid which is included in the lipid-nucleic acid particle can be a phosphodiester (i.e., an oligodeoxynucleotide consisting of nucleotide residues joined by phosphodiester linkages) or a modified nucleic acid which includes phosphorothioate or other modified linkages, and may suitably be one which is non-complementary to the human genome, such that it acts to provide immunostimulation in a manner which is independent of conventional base-pairing interactions between the nucleic acid and nucleic acids of the treated mammal. In particular, the nucleic acid may suitably contain an immune-stimulating motif such as a CpG motif, or an immune stimulating palindromic sequence. The cationic lipid included in the nucleic acid particles may be suitably selected from among DODAP, DODMA, DMDMA, DOTAP, DC-Chol, DDAB, DODAC, DMRIE, DOSPA and DOGS. In addition, the lipid particle may suitably contain an modified aggregation-limiting lipid such as a PEG-lipid, a PAO-lipid or a ganglioside.